

2017

## Research Matters Spring 2017

Louisiana State University and Agricultural & Mechanical College

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RESEARCH

Forest Fragmentation and Songbirds in Brazil

If you were to conjure up the quintessential image of a tropical paradise, it might well be a hammock slung between two beachfront palm trees, against the backdrop of a setting sun. Hammocks embody this idea of leisure. Peace and relaxation. But Ph.D. student Cameron Rutt is no longer blessed with having such an uncomplicated relationship with hammocks. After 14 months of fieldwork in the tropics, he is now accumulated about 215 nights of sleep in them.

Cameron arrived in Manaus, Brazil, in early June of 2015 and, save for a brief holiday respite at home, spent the next year and change living and working in the heart of the central Amazon. You could consider this the first field season of his doctoral research, although the notion of “season” here loses a bit of its traditional meaning. Like many of Dr. Phil Stouffer’s recent graduate students, he set to work studying the birds at the Biological Dynamics of Forest Fragments Project – a large-scale, long-term experiment designed to look at the effects of deforestation and forest fragmentation on Amazonian flora and fauna.

Specifically, Cameron is interested not only in the effects of these processes, but also why certain groups of insectivorous birds are particularly vulnerable to habitat degradation. To examine these questions, he spent hundreds of hours traipsing after understory mixed-species flocks, a group of birds that together are sensitive to anthropogenic change. Although many rightly imagine large single-species flocks (“birds of a feather flock together”), these highly complex and stable Amazonian flocks consist of *different* species. Some of these species are flock obligates, meaning that they spend their entire lives intertwined, foraging together from dawn till dusk and co-defending large territories, not against other species, but against other mixed-species flocks.



A Gray Antwren (*Myrmotherula menetriesii*), a species that only occurs in mixed-species flocks.

Cameron selected a dozen flocks across three habitat types (continuous primary forest, small forest fragments and secondary forest) and followed each flock monthly for the duration of a year. Among other things, he is hoping to better quantify what represents quality habitat for these birds. Although presence data and abundance estimates are one way to do so,

Forest Fragmentation continued on page 2



Ph.D. student Cameron Rutt takes field notes in the Amazon rainforest.





# DIRECTOR'S MESSAGE



Allen Rutherford

We continue to excel in a multitude of academic tasks, which allows us to remain one of the top natural resource programs in the nation. Our undergraduate student body continues to grow, and our student quality continues to increase.

Our research faculty continues to produce scholarly publications and train graduate students with state, federal and private grant funding. Our extension faculty continues to offer effective training to natural resources stakeholders throughout the State. Our undergraduate and graduate students continue to garner college, campus, national and international awards. You have reason to be very proud of the award-winning faculty and students in the School.

Over the years we have received feedback from our alums and employers that, while our students have good technical skills, they need better written and oral communication skills (“soft skills”). Several years ago LSU created a campus-wide Communication across the Curriculum program (CxC) that is specifically designed to develop students’ soft skills. LSU was the first university to create this type of program!

To be CxC certified, courses must include specific communications-related materials, and the course instructor must go through a communications training program. LSU offers several hundred CxC courses each semester that our students can access. RNR currently teaches seven certified communication intensive courses, but many other RNR course include communications-related components. Most recently, we have increased our focus in communications at the graduate level. We believe that strong communication skills, in addition to technical knowledge, an appreciation for civic engagement and leadership skills, will allow our graduates to be successful in their chosen profession.

After 30 years with classrooms designed prior to the advent of laptop computers and digital projectors we have completed renovations of our main classrooms (RNR 141, 142 and 230).

We were able to upgrade to tables with power available for laptop computers, added comfortable chairs, as well as refreshing the paint and adding new digital projectors. All of this was made possible by generous donations from friends and alumni of the School. Thanks to all of you who donated for this project. In the



Renovations, made possible by generous donations to the School, were made to three classrooms, including RNR 141 shown here.

face of financial limitations we continue to need your support to maintain and build a quality program. Even small annual donations can make a huge difference.

In the coming year we anticipate filling the Wildlife Extension position that was vacated when Dr. Don Reed retired several years ago. We look forward to filling this needed position and certainly appreciate Dr. Reed’s continued willingness to support the School in his retirement.

Hopefully this newsletter will highlight what’s going on in the School. We always love hearing from you and would urge each of you to contact me by phone, email, or through the School’s Facebook page.

Please let me know if you have any questions, concerns or comments. We strive to improve what we do and your input is always welcomed.

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## Historic Flood Displaces RNR Staff, Students, Faculty

The historic flood in August 2016 displaced numerous staff, students and faculty. Many were flooded then and still remain out of their homes as of early 2017. During the flood, other RNR students, staff and faculty worked heroically to help save people and property with airboat and boat rescues (see <http://www.rnr.lsu.edu/aboutus/flood-efforts-2016.htm> for personal stories and photos of the rescue efforts). During the days and weeks following the flood, the efforts shifted to collecting emergency supplies and gutting and rebuilding homes. As devastating as the flood was, it was inspiring to see the efforts of RNR and our fellow residents come together in the recovery.

## Forest Fragmentation continued from page 1

Cameron wants to see whether a fitness metric – reproductive activity or success – might differ between these three treatments. Preliminary analyses suggest that secondary forest flocks contain fewer species that show signs of breeding (nest-building, family groups, etc.) and fewer species that produce fledglings than do those flocks in primary forest.

Cameron is also eager to see how flocks in small forest fragments are affected when the regrowth that surrounds their cookie-cutter home has been cleared. Recent studies have suggested that this habitat, which grows back following a clearcut or burn, is more valuable to wildlife than was initially thought. For this, Cameron is following flocks that a prior Ph.D. student, Karl Mokross, followed about five years ago. Since that time, each of the project’s forest fragments have been reisolated. Although Cameron has only just begun to analyze the results, it is clear that flocks in small fragments have since become imprisoned after the relatively narrow strip (about 100 m) of forest that borders these fragments was felled. Further analyses will be necessary to show whether the flocks themselves have changed during this interim, perhaps diminishing in species richness or in the strength of their social networks.

Remote fieldwork in a foreign country,

although bristling with novelty and exciting discoveries, also brings with it a certain suite of predictable side effects. Cameron is not a stranger to solitude – having previously worked a variety of far-flung field jobs in remote settings – but the linguistic version was a new twist for him. He could have never anticipated that taking a vow of silence would also be a prerequisite for his dissertation, but a glaring lack of Portuguese skills provided routine...opportunities, let’s say, to display humility. This extra hurdle provided adventures and roadblocks at every corner, from giving and receiving “directions” from field assistants to living in a *república* with a small flock of Brazilian grad students and trying to make friends with a very limited repertoire. It turns out that learning in grad school need not be restricted to just those things academic.

Hammocks, like R&R, mean something else entirely to the rest of the world, but I wouldn’t go back to a time when he, too, shared those definitions. Although his tropical hammock was outfitted with a mosquito net that trapped the stifling heat, he wouldn’t trade it for a second. Well, on second thought, maybe just a few seconds on that utopian beach....Stay tuned as the Stouffer lab continues to try and unravel how our actions affect the incredibly species-rich Amazon Rainforest.

**School of Renewable Natural Resources**  
**Research Matters - Spring 2017**

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The LSU AgCenter and LSU provide equal opportunities in programs and employment.





# Kristin DeMarco's Flood Experience

by Kristin DeMarco, Ph.D. Student

It's Wednesday August 17<sup>th</sup> – a full four days after the worst of the flooding – and I'm in French Settlement, Louisiana, part of a five-truck and trailer convoy orchestrated by the Louisiana State Animal Response Team (LSART), out of the LSU Vet School.

I'm one of two airboat drivers in a group of four boats, towing my favorite machine in the world, "The Fabre," named after Eric Fabre, an RNR student worker in our lab, who was killed in a hit-and-run accident in the summer of 2014.

We get off the Livingston exit all right, but shortly thereafter, the flooded creeks and bayous have made most of the small town virtually impassable, and literally underwater. Small farm properties are the norm in this area, with lots of backyard horses, pigs and cattle. These animals are a primary reason the LSART team of veterinarians and veterinary students respond to calls from property/animal owners in the area who are desperate



Kristin DeMarco helps rescue stranded animals.

## Using an LSU AgCenter Airboat for Something Other Than Research

By Andy Nyman, Professor

As I was getting ready for bed on Saturday night, August 13, 2016, someone called and asked me to bring an airboat to the East Side Fire Department. Around midnight, I launched the airboat on S. Harrell's Ferry Rd at O'Neal Lane after a fireman named Brian Besson put a generator in the airboat so he could run a huge, but hot-to-hold light. Brian had already been awake two days; earlier that morning he had evacuated his wife and three daughters from their new house before returning to work.

We headed east down S. Harrell's Ferry Rd. at first on flooded roadway. I realized the airboat was necessary after we crossed several hundred feet of road that was not flooded and entered a flooded area that was not accessible to boats with outboard motors. There was only 3-5 feet of water on the streets but the current often was more rapid than I've ever seen in the Atchafalaya Basin or in coastal marshes. There were standing waves and white water, especially at intersections, which really surprised me.

I was afraid of hitting powerlines. A couple of times I hit things and realized I was breaking people's mailboxes down; I was afraid of running over fire hydrants. Until dawn, we took people from flooded homes south across Jones Creek where they could use their cell phones and call someone to pick them up in a place that was still car-accessible.

Around dawn, Brian said that his fire station was getting close to flooding and that he need to raise some equipment; he also had been awake

for someone to check on their animals. We see many dead animals on the way from our makeshift boat launch (a ditch that has flooded to appropriate levels) to the location of interest.

The first property we respond to is heartbreaking scene. I drive the airboat up as slowly as I can, balancing the need for calm and quiet with the need to steer. As we approach the front porch of the house surrounded by water, there are two ponies, a mare, a stallion, a Brahma cow, seven chickens, three dead rabbits, four cats, a dog and a cage with several pet rats, all trying as best as they can to escape the water below. Nearby, three giant pigs are in the back of a pick-up truck.

These animals have been without food and water for days, are scoured by the sun and are truly at the edge of their physical tolerance levels. As the other boats steer off to respond to other calls, we stay here to administer IV fluids and medical care and provide fresh water and food to the larger animals, which can't be moved, and catch the smaller animals to take back to Baton Rouge for care.

The veterinarians are adept at their job, moving the big horses to the back porch where they'll have more shade and room and wrangling the pigs into carriers (think enormous dog crates) to take back to the vet school. We load up the animals on our boats and head out to the next call.

There's a report of a horse tied to a bridge, stuck in shoulder deep water. A pig on a porch, a small kitten inside left behind. Three unfixed male Shetland ponies are tearing through the higher parts of the neighborhood, chasing everything in sight, seemingly enjoying their freedom. We found a terrified puppy under a bridge, housecats and dogs on roofs and horses trapped in pens. Everywhere, animals had taken to porches abandoned by their humans, the only dry ground around. We do what we can, but daylight fades and we have to load up and head back to campus.

While loading the boat up, I was approached by several folks from the town. Initially, I was wary – people were stressed to the point of breaking, and there had been more than one local who had told us in no uncertain terms that we were not to come onto their property. Instead, I was passed tiny puppies to hold, asked if I needed anything, and flashlights were held to make sure I had enough light to hook up the boat. A large man with waders and a four-day stubble hugged me like I was family, and pleaded with us to come over to their church to have jambalaya. "Will you stay?" he asked. "It's our way of life. What else can we do? We are unfit to live anywhere else."

three days and needed some sleep. I had been awake a day myself, but I felt fine, and I wanted to get back to numerous people still wanting to get out of their flooded homes. I kept driving, but Brian told me it would be faster to bring people west to where we had launched from the truck, so I continued taking people from flooded homes.

Initially at O'Neal, I could see ambulances, sheriffs and a tent where journalists were interviewing people who were walking out on their own. Soon, a few personal outboard boats arrived that could drive from O'Neal to the fire station. At that point, I stopped bringing people all the way back to O'Neal; instead, I dropped them off near the fire station and told them to walk a hundred yards or so to where the outboards could reach them. Occasionally I would have passengers too old, young or sick to make the walk and transfer to the outboards, and I'd bring them all the way to O'Neal.

This was probably ruining the "teflon" bottom on the airboat, but I thought it was necessary. Around 3 p.m. I decided to stop. When I got to O'Neal and S. Harrell's Ferry Rd., I trailered the airboat and then noticed there were no reporters, no sheriffs, no ambulances. Some 50 to 100 people were sitting around on this island in the middle of the flood with no food, no water, no bathrooms, and nowhere to go. I got home around 4 p.m. after driving through very deep water and passing several trucks that had stalled.







# Gopher Tortoise Conservation in the Southeastern United States



A gopher tortoise in longleaf pine habitat.

The gopher tortoise is a species of conservation concern in the southeastern United States that has experienced dramatic population declines during the past century.

Gopher tortoises are important members of longleaf pine ecosystems because they disperse seeds, and they produce burrows used not only by tortoises but also by hundreds of animals of the longleaf pine ecosystem. Although loss of longleaf pine forests may be the main factor contributing to tortoise declines, an infectious upper respiratory tract disease (URTD) may be associated with recent gopher tortoise die offs in some populations.

The immune system’s response to foreign pathogens such as bacteria, viruses, fungi and parasites is partially under genetic control through immune response genes. In particular, some immune response genes are associated with pathogen recognition, and particular pathogens may be able to escape immune system detection by changing their composition, making them invisible to the immune system’s sentinels. Further, when host populations possess low genetic diversity, individuals may possess the same variants of immune response genes, and the preponderance of similar alleles makes the population more vulnerable to quickly changing pathogens that avoid immune system detection.

Given that gopher tortoises are susceptible to URTD, it would be nice to determine what genetic variants are associated with URTD susceptibility to bolster genetic diversity at these genes. Such knowledge could help wildlife managers identify tortoises suitable for translocation from donor to at risk populations. To this end, Dr. Jean Elbers (a former RNR Ph.D. student), his adviser Dr. Sabrina Taylor and Dr. Mary Brown at the University of Florida sequenced hundreds of immune response genes from 16 wild Florida gopher tortoises. All 16 tortoises produced antibodies against the bacterium *Mycoplasma agassizii*, one of the causative agents of URTD, meaning these tortoises were at some point exposed to the bacterium. These 16 tortoises represented two clinical status groups: 6 were never observed with clinical signs of URTD, and the remaining 10 were observed at least once with mild-to-severe nasal discharge (an important clinical sign of URTD), and so these tortoises were considered to be susceptible to the disease.



A gopher tortoise inside a burrow.

The genetic variants with the strongest associations to gopher tortoise URTD clinical status (i.e., tortoises with or without URTD clinical signs) were found in three immune response genes. The first gene may produce a protein that is activated by the presence of *Mycoplasma* bacteria, which once activated, breaks down into fragments that coat the surface of bacteria leading to phagocytosis (eating) or lysis (breaking apart) of the foreign *Mycoplasma* cell.

The second gene likely produces a receptor protein found on sentinel cells of the immune system that detect foreign sugar molecules. These receptors cells, called natural killer cells, assist in the immune response, but can sometimes overreact to *Mycoplasma* infections, negatively impacting *Mycoplasma* clearance.

The third gene produces another receptor protein that proliferates when surface proteins of *Mycoplasma* bacteria are detected. This receptor proliferation influences other important immune system processes.

Several conservation implications are based on the associations found between genetic variants and URTD clinical status. First, in a prior study, all of the gopher tortoises sequenced from Louisiana, Alabama, Georgia and Florida

populations possessed the same genetic variant in one of the three genes associated with URTD (above) as the gopher tortoises with URTD clinical signs.

If the association between genetic variants and URTD clinical status exists for most tortoises, and these associations proved to be causal rather than correlated, it is possible that tortoises across the range of the species possess genetic variation making them susceptible to URTD.

Further, nearly one quarter of the tortoises in the Georgia population presented mild-to-severe clinical signs of URTD. This suggests some correlation between genetic variation associated with disease susceptibility and actual presentation of disease.

Further experimental studies and more careful examination of these genes are needed before concluding any causal relationship between these genetic variants and URTD susceptibility.

## Kidombo and Dean Study Crown Structure and Tree Growth

Shannon Kidombo, a Ph.D. student working with Dr. Thomas Dean, is investigating the mechanisms of how intercrown competition and crown dynamics control growth of trees. Researchers often deduce the health and vigor of a plant from its leaves (collectively viewed as the crown) because of their sensitivity to changes in the environment. The growth of a plant is related to the size, shape and efficiency of the crown and its ability to intercept incident radiation. However, the relationship between tree crown structure and how trees grow is not well understood, and therefore we may not be able to accurately predict how trees respond to changing climate, environmental stress, competition and silvicultural practices.

To address this issue, Shannon is investigating the interdependence among the growth of leaf areas, branches and the stem of young loblolly pine trees to test whether growth of trees coordinates predictably with changes in crown structure. Preliminary findings show that branches in the crown rely on local leaf area for supply of carbohydrates and receive little support from neighbors. There is further indication that growth in stem diameter and taper correlates predictably with changes in the crown. These findings will increase accuracy in models of tree growth.



Shannon Kidombo measures the height of a tree.





## New Source of Blue Carbon Studied in Coastal Wetlands

Coastal wetlands, including tidal marshes, mangroves and seagrass, are valuable habitats threatened by climate change, which are also highly efficient at sequestering and storing carbon (C) from the atmosphere. “Blue carbon” refers to the unique capacity coastal wetlands have to store C primarily as organic matter in waterlogged sediments, as opposed to



Sediment core retrieved from freshwater SAV habitat in Terrebonne Basin, Louisiana.

terrestrial forests that store C in the biomass of trees, which ultimately die, decompose and release CO<sub>2</sub> back into the atmosphere. This makes coastal wetlands more efficient at storing C than terrestrial forests because C can be stored in coastal systems for thousands instead of hundreds of years.

Located throughout our coastal marsh areas, shallow-water submerged aquatic vegetation (SAV) habitats have thus far not been incorporated into blue carbon studies of coastal wetlands. The deltaic watersheds in southeast Louisiana alone contain over 55,000 hectares of potential SAV habitat, which highlights the need to quantify C storage in SAV habitat to better estimate C stocks on regional and global scales.

Over the last two years, Eva Hillmann (Ph.D.; La Peyre) quantified C storage from sediment cores collected in SAV habitats across three deltaic Louisiana watersheds (Pontchartrain, Barataria, Terrebonne) in coastal Louisiana. Sites were distributed across the salinity gradient, ranging from freshwater to saline seagrass habitat located adjacent to the Chandeleur Islands.

Preliminary data indicate that SAV habitats in southeastern Louisiana store on average  $231.63 \pm 19.53$  Mg C ha<sup>-1</sup> in the top meter of sediment from SAV habitats, which is greater than the reported global median of C in sediments located in seagrass beds (estimated: 139.7 Mg ha<sup>-1</sup>). The overall high potential storage in southeast Louisiana is due to the extensive fresh, intermediate and brackish regions of the state as freshwater SAV habitats had much higher C storage as compared to saline seagrass sites.

Identifying the amount of C in the top meter of southeastern Louisiana SAV sediment enables us to estimate that SAV habitat in deltaic Louisiana (55,000 ha) potentially stores up to 12.7 Tg, or 0.01 Pg of C. This represents a significant and as yet unaccounted pool of stored blue carbon, particularly when these numbers are extrapolated across the gulf coast, and globally into other extensive coastal SAV habitat. Current assessments of global seagrass C stocks range between 4.2 and 8.4 Pg C. Although more research is needed, incorporating global estimates of SAV sediment C stocks will likely improve and increase estimates of blue carbon stocks across coastal wetland systems.

## Winter Movement Patterns and Habitat Use of American Woodcock

The American Woodcock (*Scolopax minor*) lives across the eastern U.S., breeding in the north from Maine to Manitoba, and moving south to Louisiana when the ground freezes, and they are no longer able catch earthworms, their primary source of food. Declining numbers of Woodcock have recently led to several studies examining how the birds use habitat, but few have focused on their winter habitat.

M.S. student Lisa Elizondo is working with Dr. Collier to take a comprehensive look at the movement patterns and habitat use of Louisiana Woodcock during the winter. She will be using newly developed GPS tags that are now small enough to use on small species such as Woodcock. Lisa’s study is the first to deploy these new GPS tags, which will allow her to obtain around 20 location points per day for each

bird. This contrasts with previous work, which relied on small VHF (very high frequency) radio tags, a type of tag that required researchers to physically track the bird to obtain location data, a time-consuming process yielding little data.

Although these GPS tags are now small enough to deploy on Woodcock, they must still be physically recovered to download the data. Lisa will be wrapping up the second year of her study soon, but she has already recovered many tags containing about 4,000 Woodcock location points.

This study is an exciting step forward, both for our knowledge of Woodcock and for other birds this size. Although the data are still being processed, Lisa is already getting a much better understanding of the day to day movements of these birds. Previous work

showed that Woodcocks use thick, young forest habitat during the day and moved to open fields at night. Lisa’s preliminary results suggest that Woodcocks overnight in the woods more frequently than earlier research has suggested. Her final analysis will ultimately be able to identify important habitats for this declining species.



A GPS pinpoint tag on a Woodcock.



M.S. student Lisa Elizondo holds a tagged Woodcock.





### Leaving Their (Bio)Mark

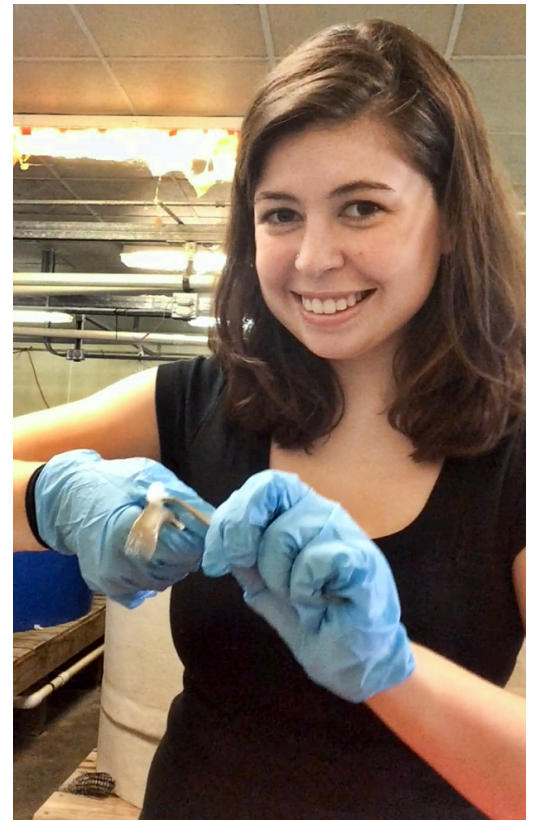
Animals have to constantly adapt to their environment and unexpected stressors throughout life. One way researchers can study stress in animals is through monitoring chemical-based physiological changes. These measureable substances are known as biomarkers and can include compounds within blood and tissues, such as hormones, enzymes and antibodies. Unfortunately, the collection of these compounds inside the body is stressful, or, in some cases, lethal. The development of external biomarkers that provide the same information reduce stress and mortality in animals, which would be particularly beneficial when working with rare species. Current research in the School is working on the development of these external biomarkers for fish and birds.

Dr. Chris Green's lab at the Aquaculture Research Station is working to collect nonlethal biomarkers from mucus found on the surface of the fish. Fish mucus is the first line of defense against bacterial diseases and parasites. In addition, mucus and skin cells have also been found to release pheromones serving as reproduction cues and warnings about predators.

Mucus contains a host of chemicals that can tell a lot about what is going on inside the fish. For example, Andrea Yammine is working on her M.S. degree to determine if indicators in the mucus

can provide clues to the impacts of chemicals on reproductive health. Using Gulf killifish, Andrea has found that there is a relationship between hormone markers found in both the blood and mucus. After determining these relationships, her research conducted experiments to expose groups of fish to different toxicants that disrupt male and female reproductive health. The work has also begun to examine immune markers within the mucus that are important in warding off diseases. These experimental exposures in the lab have demonstrated that researchers could look at mucus from fishes in the field and learn more about reproductive health and immune status.

The work on biomarkers outside of the body is not limited to fish. Angélica Hernández Palma, a Ph.D. student in Dr. Phil Stouffer's lab, isolated the stress hormone corticosterone from bird feathers collected in the Brazilian Amazon to determine if stress levels were higher in birds from forest fragments. Birds in small fragments grew poorer quality feathers than those in undisturbed forests, but birds in undisturbed forests had higher corticosterone levels, possibly due to the stresses of territorial interactions.



Andrea Yammine (M.S. Student) collects mucus from a Gulf killifish to measure reproductive hormones and immunity related enzymes.

### Mapping Submerged Aquatic Vegetation in the Coastal Zone

Submerged aquatic vegetation (SAV) creates valuable shallow water habitats in the coastal landscape of the northern Gulf of Mexico, providing habitat refuge for underwater species and high quality forage for waterfowl. However, baseline spatial data describing SAV distribution and abundance in response to environmental drivers like salinity, exposure to wind and waves, turbidity and depth are lacking.

Due to the highly dynamic nature of SAVs, predicting occurrence and increasing the likelihood of presence has been problematic for coastal resource managers. Mapping SAV resource availability is a particularly pressing need in the northern Gulf of Mexico. Sea level rise is predicted to inundate much of the

coastal zone, changing salinity zones inland and increasing shallow open water areas, dramatically altering the areas potentially able to support SAV habitats.

Ph.D. student Kristin DeMarco is currently working to develop a predictive spatial model and associated maps describing SAV occurrence and distribution in the northern Gulf of Mexico (NGOM) – she has been able to identify spatial environmental drivers of SAV presence in Louisiana. DeMarco was recruited by Dr. Megan La Peyre for a massive field focused project to collect baseline data on SAV resources and has been using these data to quantify the mechanisms and processes determining SAV presence. Field data were collected across the NGOM at 384

sites over three years (Nueces River, Texas, to Mobile Bay, Alabama, from 2013 to 2015) to develop the spatial dataset.

In the entire study area, SAV was present at approximately 45 percent of all sites over the three years. There was no difference in presence among fresh, intermediate and brackish marsh types, but saline marsh types had significantly less SAV than other marsh zones.

To develop the predictive model for SAV occurrence, which will create a SAV likelihood map for unsampled areas, DeMarco used the Louisiana Coastwide Reference Monitoring System water quality data (salinity, inundation depth, temperature) to determine key environmental drivers.

To determine the exposure and turbidity variables that DeMarco suspected had a great impact on SAV presence, she worked with Brady Couvillion, a geographer with the U. S. Geological Survey to create spatial layers representing these variables. Preliminary results show that in Louisiana, the primary environmental drivers of SAV presence are seasonal salinity mean, seasonal salinity variability, water clarity (turbidity) and exposure to wind and waves.

Efforts are ongoing to convert the statistical SAV occurrence model into a spatial model and map for Louisiana. These modeling tools and maps can predict the probability of SAV occurrence at any given area on the Louisiana coast and also will be used to predict future impacts on SAV habitats.

Models and data for SAV occurrence are highly valuable to coastal resource managers trying to develop carrying capacity estimates for wildlife, including highly desirable waterfowl species. Moreover, explicitly quantifying the key drivers for SAV occurrence will be useful as the Louisiana State Master Plan seeks to identify the impacts of restoration projects on coastal habitats.

Kristin DeMarco presented preliminary maps at the Restore Americas Estuaries conference in New Orleans in December 2016. In addition to Kristin, the research team includes Stuart Brown (CPRA), Brady Couvillion (USGS-WARC) and Dr. Megan La Peyre (USGS/RNR). Data was collected for the project by an army of current and former RNR undergraduate students.



Ph.D. student Kristin DeMarco collects submerged aquatic vegetation in Barataria Bay, Louisiana.





## Understanding Regeneration and Hydrology in Bottomland Hardwood Forests

Bottomland hardwood forests (BLH) are floodplain ecosystems of the southeastern United States that provide valuable timber resources and wildlife habitat. Species such as the Louisiana black bear, Prothonotary Warbler, overcup oak and a number waterfowl species rely on this ecosystem for all or part of their life cycles. In addition to providing wildlife habitat, these wetlands help remove pollutants from river water and act to reduce flood heights by storing water outside of the main channel. In addition, they can absorb large amounts of carbon through accumulation of woody biomass and therefore may be important systems in the fight against global climate change.

Unfortunately, river engineering projects such as levee and reservoir construction, river dredging and channelization have altered the natural relationship between the river and the adjacent forested wetland. Because they are located on floodplains, these ecosystems are intimately connected to the river channels; over centuries, the forests and wildlife evolved to tolerate regular flooding events that were dynamic in depth, frequency and duration. These floods also functioned as the architects of the landscape, constantly depositing and eroding sediments, providing nutrient-rich soils and producing various geomorphic features that created a diverse landscape capable of supporting a rich species community.

Within the past century, the rivers of the southeastern U.S. have been dramatically altered for the purposes of flood control and navigation. Rivers have been straightened, deepened and widened to support the transportation of ships. Levees now disconnect many rivers from their floodplain. Recent research in RNR indicates that the species composition on some BLH sites is changing and appears to be related to the hydrologic changes. However, we do not understand the specific mechanisms behind these changes, and our rudimentary understanding of floodplain hydrology limits our ability to develop effective restoration and management strategies.

In 2016, the Louisiana Department of Wildlife and Fisheries funded research through a grant developed by Drs. King and Keim. One aspect of this study, led by Whitney Kroschel (Ph.D.; King), is focused on quantifying the effects of flooding on BLH regeneration (i.e., the replacement of mature individuals with new individuals of the same species). Individual seeds and seedlings are much more vulnerable to death from factors such as herbivory, fungal attack, burial by sediment, drought and flooding than are mature trees. If a major disturbance, such as flooding, is removed from the ecosystem or the intensity or frequency of floods change, it may alter the survival rate and species composition of the seed/seedling population. Therefore, the team is evaluating the relationship between flooding and the survival of BLH tree seedlings at two wildlife management areas in northern Louisiana and exposing newly germinated seedlings of various species to floods of different lengths in a greenhouse.

A second component of the study, led by Mary Grace Lemon (Ph.D.; Keim), is focused on hydrologic processes. Just as people have a monthly

budget based on earning (inputs) and expenditures (outputs), wetlands also have a water budget. The water budget of most BLH consists of inputs from local precipitation, regional groundwater and river water and outputs from evaporation at the land surface and transpiration due to plant photosynthesis.



Whitney Kroschel identifies tree seedlings at Boeuf Wildlife Management Area.

The first goal is to improve our understanding of how the importance of different water sources varies throughout the growing season and in different locations within the forest. One way to approach this objective is to use stable isotopes – different forms of the same element that naturally occur in the environment. Isotopes of water can trace different water sources in the soil and trees. This is achieved by taking hundreds of samples of precipitation and river water to characterize the site-specific temporal fluctuations in the stable isotope signatures. Soil and tree wood samples are then taken in different locations across the floodplain relative to the river and at various times during the year. The water from these samples is extracted, and the proportion of river water and precipitation in each sample will be determined.

Differences in the relative importance of source waters across a forest will most likely be related to soil heterogeneity or the variety of materials that compose the forest soil. Over thousands of years, the river has continuously reworked the forest soil, eroding and depositing material over and over again. This process creates diverse landscape features throughout forested wetlands such as scroll bars, oxbow depressions, backswamps and natural levees.

Each of these features has slightly different soil types; therefore, water moves through the soil at different speeds, ranging from relatively fast for sandy soils and extremely slow for clay soils. Thus, depending on the location, some soils may be more connected to and receive more water from the river than a different location.

The results of this study, along with other hydrometric measurements such as soil moisture and groundwater table monitoring, will allow the team to develop a map of source water importance for a specific forest and better understand how this pattern may vary relative to other forested wetlands in the southeast that have dissimilar geology and hydroclimate.

Another important part of the forest water budget is the output component, transpiration. When trees are actively photosynthesizing, they constantly suck water out of the ground and release it as water vapor back into the atmosphere. BLH start actively transpiring during the early spring after regaining new foliage. Leaf-out is generally thought to be controlled by temperature; however, some studies indicate water also may be important.

Forested wetland phenology, or the cycle of leafing on and off throughout the growing season, has not been thoroughly investigated. Therefore, to predict how tree phenology cycles and thus transpiration flux may respond to river modification and climate change, the effects of hydrology on this process must be better understood. This objective will be addressed by using remotely sensed vegetation indices and phenology modeling by comparing forests with modified hydrology to nearby sites that have maintained a more natural relationship between floodplain and river.

Improving the state of knowledge about the water budget of forested wetlands will lead to better management recommendations for these systems in the face of continued river modification and climate change. This will enhance our ability to conserve this ecosystem and the services provided by it for future generations.



Mary Grace Lemon collects water samples for stable isotope analysis.





### LSU Graduate Students Focus on Wetlands and Water Issues in California and Oregon

In July 2016, 10 graduate students and Drs. King, Keim and Laborde visited California and Oregon to learn about wetland conservation and management in a region characterized by extreme water conflicts. The trip started with an overnight stay and tour of the Rancho Esquon Duck Club. Dr. Fritz Reid of Ducks Unlimited gave a tour of the property, as well as other duck clubs, and provided the group with wonderful insights on wetland issues in the region as well as treating them to fabulous wetland cuisine (i.e., grilled ducks).

Water development impacts to the Sacramento Valley wetlands were clearly evident as the group toured Sacramento Valley National Wildlife Refuge. This refuge is one of the most intensively managed in the country, allowing it to continue to sustain wetland wildlife functions on a fraction of the water it once received but at significant financial and ecological costs. The class learned that, in places that have been affected as severely as the Sacramento Valley, a choice has to be made about which wetland functions can be sustained, and that managed systems may not resemble the historic natural system.

After leaving the Sacramento Valley, the class headed to northeastern California to visit Modoc National Wildlife Refuge. At Modoc, where wet meadow restoration is a priority, the class was exposed to water budgets from a radically different hydrologic region than Louisiana and to innovative restoration techniques.

The class then visited one of the most hotly contested water regions in the country, the Klamath Basin of northern California and southeastern Oregon. Refuge biologist John Vradenburg arranged for airboat tours of Lower Klamath Lake National Wildlife Refuge and visits with several farmers that farm portions of Lower Klamath and Tule Lake National Wildlife Refuges. The students learned about innovative management practices, in which farmers on the refuge integrate moist soil management into organic farming rotations to provide economic benefits to the farmers and habitat benefits to the refuge. The students also learned about the



Graduate students Scott Harlamert, Anna Beth McCall (DOCS) and Mary Grace Lemon study fossils in the ash layer from soils at Tule Lake NWR.

challenges posed by the Endangered Species Act, Native American Rights and water rights on often competing conservation goals.

From the Klamath Basin, the class took a slight detour through Crater Lake National Park before heading to Klamath Marsh National Wildlife Refuge where they were entertained by the refuge manager, Mike Johnson. Mike provided a wonderful Native American history of the area, a grand tour of the marsh and treated the class to his wonderful sense of humor!

The class then visited Summer Lake Wildlife Area in southeastern Oregon. Summer Lake supports spectacular arid wetlands, and Marty St. Louis unpackaged his insights on the natural processes and management of that wetland gained over a lifetime working at that area.

The class then headed even further west to the Oregon coast and then south to Humboldt Bay National Wildlife Refuge in California. Humboldt Bay is a coastal refuge that is intensively managed to provide habitat for endangered salmon and waterbirds. Prior to refuge acquisition, drainage for pasture led to several feet of subsidence so managing for

freshwater processes in this coastal environment is challenging.

The class ended the trip with a tour of the redwood forest on the way back to the Sacramento airport. A class discussion in the redwoods revealed how impressive the trip had been for the students. The intensity of water issues, the legal complexities and constraints of the Endangered Species Act and Native American rights, the people impacted by water decisions and the sheer beauty and ecological value of the region provided everyone with a deeper appreciation of the region and of those who are struggling to find solutions in a complex and contentious environment.

The class thanks the generous anonymous donor and Dr. Rutherford for making this trip possible. The class also thanks all of the staff from the refuges they visited; some of you may have not been specifically named but you and your efforts are deeply appreciated!

### RNR Focuses on Science Communication

How do we use communication media to engage an often disinterested and untrusting public about important natural resource issues? How do we communicate with our political representatives and other decision makers? These are questions that many natural resource professionals and agencies are now asking. Traditionally, training in the science fields has focused strictly on the science, but more recently, there has been an explosion of interest in science communication skills.

Several RNR faculty members decided to address this issue in the School of Renewable Natural Resources. In May 2016, the School hosted a Science Communication workshop that was led by David Rochkind, an internationally known photo journalist, plus other communication professionals. The workshop introduced faculty and graduate students to basic communication principles along with specific techniques used in the various media. It was an outstanding introduction to the world of professional science communication!

Drs. LaPeyre, Taylor, and King used the workshop as a springboard to develop a graduate level communications seminar in Fall 2016. In the fall seminar class, students were introduced to science communication theory and advanced technical writing concepts. In addition, they had to provide multiple short presentations of their research, including an interview that was taped by LSU AgCenter Ag Communications.

Professionals from diverse groups, including the communications department at Louisiana Department of Wildlife and Fisheries (Gabe Giffin), the LSU AgCenter (Tobie Blanchard and Craig Gautreaux), Toastmasters (Emily Stich) and The Advocate (Amy Wold) spoke to the class about how to communicate through video and how to address reporters, decision makers and unfriendly crowds. The class was well-received and both students and faculty benefitted from the endeavor. However, it is clear that developing communication skills is a life-long process, and RNR is discussing how to further integrate communication development into the graduate and undergraduate training.



Wetlands class at Klamath Marsh National Wildlife Refuge, Oregon.





## CLASSROOM NEWS

### Six NREM Degree Programs Receive Accreditation from the Society of American Foresters

Six areas of concentration in RNR are now accredited by the Society of American Foresters (SAF). Three of the areas of concentration – Forest Resource Management, Forest Enterprise, and Wildlife Habitat Conservation and Management – meet the standards for accreditation under SAF's traditional forestry program.

RNR's forestry curriculum has been accredited by the SAF each year since 1936. The other three areas of concentration – Conservation Biology, Ecological Restoration and Wetland Science – are now accredited under a new accreditation program created by SAF in 2014 called the Natural Resource and Ecosystem Management program.

Accreditation is a mark of academic quality, a demonstration of accountability and a promise of

continued planning for the future. RNR has long recognized the need to offer an accredited forestry curriculum in Louisiana. In fact, the School of Forestry (the precursor of RNR) graduated its first forestry student in 1926, 10 years before the SAF began accrediting forestry programs. Reaccreditation of RNR's forestry curricula continues this tradition for another 10 years.

Forestry programs across the country have created curricula to train students in natural resource and ecosystem management in recognition of the expanding role of forest management in areas such as conservation biology. The expanding curricula motivated SAF to establish standards for accrediting new programs like RNR's to ensure that students complete a recognized curricula and that employers can hire competent graduates in

natural resource and ecosystem management fields.

The dual accreditation by the SAF reflects the School's ability to identify and respond to both the continuing needs of the traditional forestry community that contributes so much to Louisiana's economy and the expanding importance and value of Louisiana's natural heritage.

### RNR Teaches Conservation Biology

Conservation Biology was originally established and taught in the Department of Entomology. It was later co-taught by Entomology and Biological Sciences. As of fall 2016, RNR is teaching Conservation Biology (fall terms) in conjunction with Biological Sciences (spring terms). Drs. Kelso and Taylor are co-teaching the course and plan to include the associated Laboratory in Conservation Biology in future years.

### Undergrads Explore Swaziland

The School of RNR continued providing opportunities for international engagement for our undergraduates. Bret Collier took his second African Wildlife Ecology class to Swaziland and South Africa in August 2016. Students conducted field research at the Mbuluzi Nature Reserve on both large and small mammals. Students experienced local Swaziland cul-

ture with trips to Hlane Royal National Park, Shewula Conservancy and Mlawula Nature Reserve.

After 10 days at the bush camp, students shifted to the Lower Sabie Camp in Kruger National Park and spent several days studying local wildlife before returning to LSU.



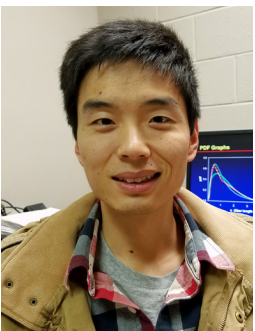
LSU students at the Mlondozi Picnic Site at Kruger National Park.



LSU students with local community elders at the Shewula Conservancy.



## INTERNATIONAL NEWS



Shuaichao Sun

**Shuaichao Sun**, a visiting student from China's Northwest Agricultural and Forestry University, will spend 16 months working with Dr. Quang Cao on modeling stand structure of pine-oak forest.

**Dr. Reagan Errera** will be taking six RNR and two Coastal Environmental Sciences undergraduate students to Praia do Tofo, Mozambique May 8 - June 4, for a course on coastal and reef field techniques and research methods. During the trip they will also be stopping at Kruger National Park. Stay tuned for incredible photos and trip news in the next newsletter!

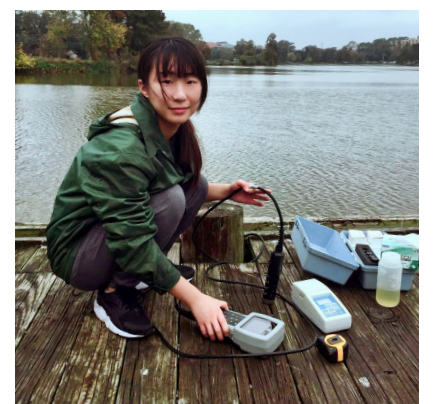
**Dr. Jun Xu** is hosting several international students for one year of study. Yuyan Zhou, a Ph.D. student from China Institute of Water Resources and Hydropower Research in Beijing, will work with Dr. Xu's lab to advance his knowledge of water quality assessment and modeling. Yiyang Wang and Shuo Yang, two visiting students from China's Sichuan Agricultural University, will work on water quality assessment of LSU University lakes. Finally, Shuwei Zheng, a Ph.D. student from East China Normal University in Shanghai, hopes to advance his knowledge of river channel dynamics and sediment transport.



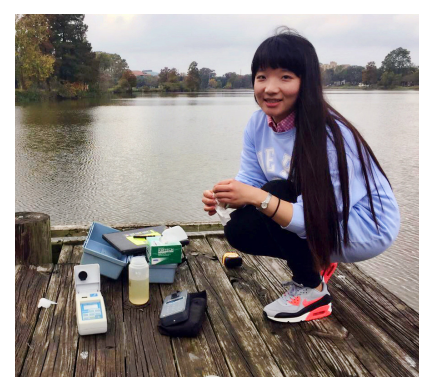
Yuyan Zhou.



Shuwei Zheng.



Yiyang Wang.



Shuo Yang.





# GRADUATE STUDENTS



Nicholas Bakner (M.S.; Collier) is examining female Eastern wild turkey reproduction and ecology in southwestern Louisiana.



Elizabeth Bonczek is a new Ph.D. student in the Ringelman lab. She will be studying the nesting ecology of Mottled Ducks in southwest Louisiana.



Trent Bullard is a new M.S. student who will be working on dietary amino acid requirements of American alligator with Dr. Reigh.



Eric Falls (M.S.; Green) is focusing his research on reproduction and endocrinology in traditional aquaculture species and imperiled species to help restore populations.



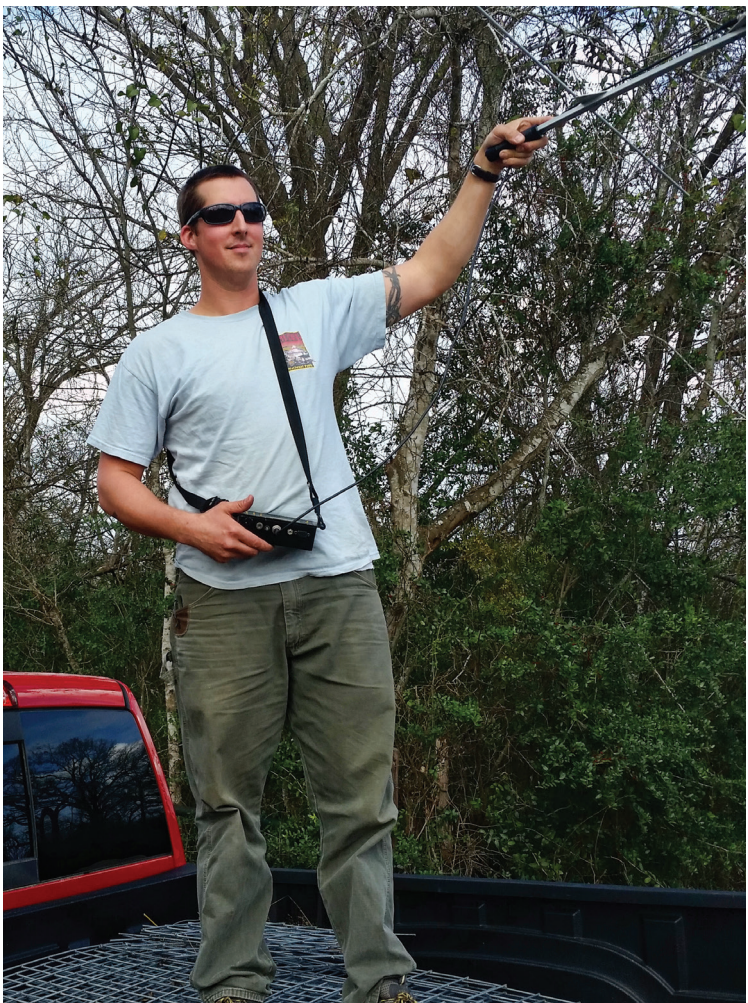
Alaina Gerrits (M.S.; Collier) is studying Eastern wild turkey movement ecology and habitat selection in South Carolina.



Alicia McAlhaney (M.S.; Keim) is using tree rings to understand combined flood stress and competition effects in wetland trees.



Nga Nguyen (Ph.D.; Keim) is working on remote sensing of water budgets and tree productivity in forested wetlands.



David Moscicki is conducting Rio Grande Turkey research as part of his M.S. degree with Dr. Collier.





# GRADUATE STUDENTS



*Gilbert Ototo is enrolled in a Ph.D. program in Forest Products Marketing and Business Development with Dr. Richard Vlosky as his major professor.*



*Lewis Peters (M.S.) is investigating the effect of gap size on the survival and growth of advanced regeneration in a bottomland hardwood stand with Dr. Dean.*



*Jeremy Reiman (M.S.; Dr. Jun Xu) will investigate transport and transformation of carbon and nutrients in the Mississippi-Atchafalaya Rivers.*



*Karis Ritenour (M.S.; King) will evaluate factors affecting nest success of colonial nesting waterbirds on Rabbit Island near Cameron, Louisiana.*



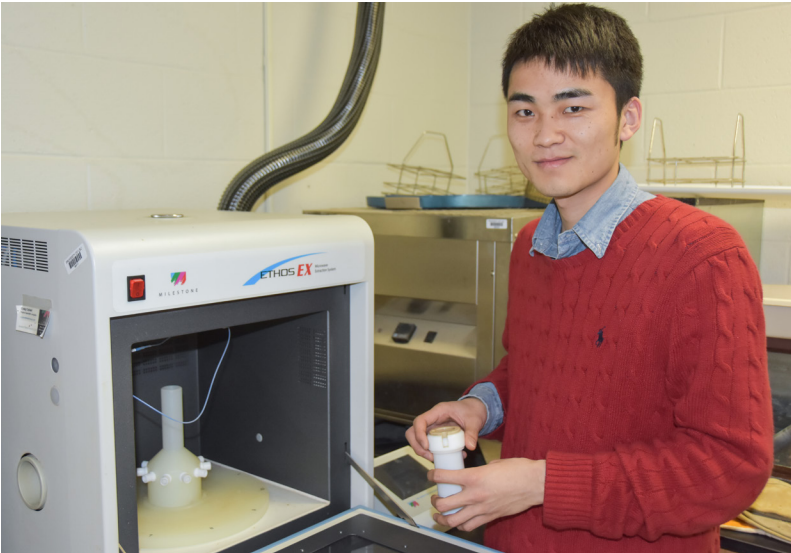
*Landon Schofield (M.S.; Collier) is studying movement ecology and reproductive phenology of Eastern wild turkeys across Louisiana.*



*Erin Thayer (Ph.D.; Kaller) will be modeling aquatic species distributions in coastal rivers across a gradient of species diversity.*



*Jacob White (M.S.; Collier) is studying Rio Grande turkey ecology in the oaks and prairies region of Texas, in particular turkey movement in relation to roosting habitat.*



*Jiulong Xie is a Ph.D. student working on making polyurethane from wood – the same kind of foam used in ice chests and houses, but more “green.” He comes from Sichuan Agricultural University in China and is adjusting to life as a new father.*



### Tiger Chapter of Ducks Unlimited

The student chapter of Ducks Unlimited hosted its fall fundraising event on November 9 at the John M. Parker Coliseum on campus. Over 30 student volunteers helped to plan and run the event, which welcomed 327 attendees and netted over \$50,000 for wetland conservation. The chapter also hosted a spring crawfish boil. Additionally, the chapter hosts speakers on conservation education, field trips to wetland restoration projects and social events. Six members of the chapter participated in DU’s university leadership development program in Memphis, and three represented LSU at the 2016 Ducks Unlimited National Convention in Anchorage, Alaska. Overall, Tiger Chapter Ducks Unlimited is in a close competition for the No. 1 university chapter in the United States for 2016. The chapter is led by RNR student Clint Pace, with an area of concentration of wildlife ecology. Chapter advisers are RNR faculty members Luke Laborde and Kevin Ringelman and RNR alumnus Alonda McCarty.



Members of the Tiger Chapter of Ducks Unlimited.

### The Aquaculture and Fisheries Club

(AFC) had an active year. Club members collaborated with an LDWF Aquatic Educator to hold a fishing clinic where they taught kids about boating/fishing safety, knot tying, casting and different types of fishing lures for different fish species. Students also used fish specimens to teach fish identification and internal fish anatomy. The club also had their annual spring crawfish boil with the RNR Alumni Association and participated in the Louisiana American Fisheries Society conference. During the fall, AFC participated in the annual Ocean Commotion event held at the PMAC. There was a life-size crab trap for the kids to crawl through and a display of fisheries related equipment. AFC also hosted a pumpkin-carving event around Halloween; the pumpkins were displayed around the Renewable Natural Resources lobby. Finally, the club hosted Scott Riley, a graduate student who served on the Peace Corps, Kayla Kimmel from USFWS, Craig Gothreaux from LDWF, and David Nieland from the College of the Coast and Environment as guest speakers at their club meetings.

### Society of American Foresters Student Chapter

The Society of American Foresters Student Chapter at LSU sold Christmas trees to raise money to attend the annual Southern Forestry Conclave. The trees were Leyland cypress raised on the Lee Memorial Forest, and forty-five trees were sold this year. The trees were premium quality, thanks to assistance from forest managers Joe Nehlig and Don Bluhm. The Chapter also had a meeting combined with the Southeastern Louisiana Chapter, in which Dr. Kristine DeLong of LSU Dept. of Geography & Anthropology enlightened us about an underwater cypress forest off the Alabama coast. Last year (March 2016), conclave was hosted by Clemson University. As usual, we brought a crawfish boil with us, which was enjoyed by students from 15 southern forestry schools and their faculty advisors. Fourteen students are preparing to compete in Mt. Enterprise, Texas, where conclave will be hosted in March by Stephen F. Austin State University.

<b>2016-17 RNR Scholarships</b>	
<b>Undergraduate Student Scholarships</b>	
Ag Development Scholarship for Forestry . . . . .	Mason Leblanc
F. O. Bateman Memorial Scholarship . . . . .	Bailey Jones
Pauline Bateman Stanley Scholarship. . . . .	Colleen Walsh
Paul Y. Burns Scholarship . . . . .	Bryce Loschen
Hunter Barrilleaux Memorial Scholarship . . . . .	Sarah Thomas
A. Bigler Crow Forestry Scholarship . . . . .	Nathan Apetrei
Eric Fabre Memorial Scholarship . . . . .	Brandon Thibodaux
Hopkins Memorial Scholarship	
Mark Dupuy Jr. Wildlife Conservation Scholarship . . . . .	Madeline Smith
William A. Knight Forestry Scholarship . . . . .	Andrew Ferachi
William A. Knight Forestry Scholarship . . . . .	Alexandra Mitchell
William A. Knight Forestry Scholarship . . . . .	Brandon Ocmund
William A. Knight Forestry Scholarship . . . . .	Jessica Bonin
William A. Knight Forestry Scholarship . . . . .	Kaiser Franck
William A. Knight Forestry Scholarship . . . . .	Alexandra Haynes
William A. Knight Forestry Scholarship . . . . .	Elizabeth Irvin
William A. Knight Forestry Scholarship . . . . .	Hunter Martin
William A. Knight Forestry Scholarship . . . . .	Christopher Coyne
William A. Knight Forestry Scholarship . . . . .	Emily Matzke
William A. Knight Forestry Scholarship . . . . .	Trevor Landry
William A. Knight Forestry Scholarship . . . . .	Morgan Gauthier
William A. Knight Forestry Scholarship . . . . .	Jamie Everhardt
William A. Knight Forestry Scholarship . . . . .	Alexis Turner
William A. Knight Forestry Scholarship . . . . .	Lilly Jobes
William A. Knight Forestry Scholarship . . . . .	Vivienne Johns
William A. Knight Forestry Scholarship . . . . .	Alexandra Joseph
William A. Knight Forestry Scholarship . . . . .	Christina Richard
William A. Knight Forestry Scholarship . . . . .	Sarah Spring
William A. Knight Forestry Scholarship . . . . .	Megan Tassin
William A. Knight Forestry Scholarship . . . . .	Riley Morris
William A. Knight Forestry Scholarship . . . . .	Lindsey Newton
William A. Knight Forestry Scholarship . . . . .	Brooke Yelvington
William A. Knight Forestry Scholarship . . . . .	Ixchel Sabonger
William A. Knight Forestry Scholarship . . . . .	Sean McGoey
William A. Knight Forestry Scholarship . . . . .	Amelia Adams
William A. Knight Forestry Scholarship . . . . .	Cory Ceravolo
William A. Knight Forestry Scholarship . . . . .	Joshua Doss
William A. Knight Forestry Scholarship . . . . .	Taylen Fisher
William A. Knight Forestry Scholarship . . . . .	Erika Juncker
William A. Knight Forestry Scholarship . . . . .	Raven Wells
William A. Knight Forestry Scholarship . . . . .	Tristan Autin
William A. Knight Forestry Scholarship . . . . .	Courtlyn Jenkins
William A. Knight Forestry Scholarship . . . . .	Lane McConnell
William A. Knight Forestry Scholarship . . . . .	Cameron Toerner
William A. Knight Forestry Scholarship . . . . .	Allison Davis
Thomas Plein Scholarship . . . . .	Colette Pansini
Billy W. Weaver Scholarship. . . . .	Andrew Corrado
Lehmann – FWF Alumni Association . . . . .	Chelsea Romph
Forestry, Wildlife, and Fisheries Alumni Association . . . . .	Lexus Lejeune
Forestry, Wildlife, and Fisheries Alumni Association . . . . .	Brandon Hernandez
Forestry, Wildlife, and Fisheries Alumni Association . . . . .	Cora Woolsey
Forestry, Wildlife, and Fisheries Alumni Association . . . . .	Ashley Breaux
Forestry, Wildlife, and Fisheries Alumni Association . . . . .	Anna Davis
Forestry, Wildlife, and Fisheries Alumni Association . . . . .	Samantha Hughes

<b>Graduate Student Scholarships</b>	
Barbara M. Edison Scholarship . . . . .	Whitney Kroschel Mary Grace Lemon
Ben and Pauline Stanley Excellence Award for Outstanding M.S. Student . . . . .	Kelcee Smith
Clark M. Hoffpauer Scholarship for RNR Graduate Students . . . . .	Shannon Kidombo

**Les Voyageurs . . . . .** Brad Frazier  
*Les Voyageurs are a carefully selected group of 16 students from the College of Agriculture who represent the college and LSU in recruitment, alumni and development activities.*



LSU RNR students Emily Oakman (l.) and Jacqueline Satter (r.) placed 7th in Jill and Jill Crosscut sawing at the Southern Forestry Conclave hosted by Clemson University.





Kelcee Smith Awarded Sigma Xi Grant

Congratulations to Kelcee Smith who was awarded by Sigma Xi with a Grant-In-Aid of Research. Her proposal, one of only 5 percent funded, will allow her to travel to museums in the southeast to sample historic DNA from museum sawfish rostra. Kelcee is working with Drs. Taylor, Kelso and Kaller to estimate population size using mark-recapture and genetic techniques.



Kelcee holds a Smalltooth Sawfish rostrum (directed research under ESA permit #17787).

Recent RNR Grad Earns Prestigious Post-Doctoral Position

In February 2017, Scott Allen (Ph.D. graduate August 2016) began post-doctoral research at the Swiss Federal Institute of Technology (ETH) in Zurich. The project, funded by the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), aims to use isotope tracers to improve fundamental understanding of how water moves through soils and the landscape. This is a high-profile project because it includes broad-scale sample collection and creation of a large enough dataset to address questions on a scale not previously feasible. Scott is bringing his expertise in water movement in the critical zone (the soil-plant-atmosphere interface) to this project.

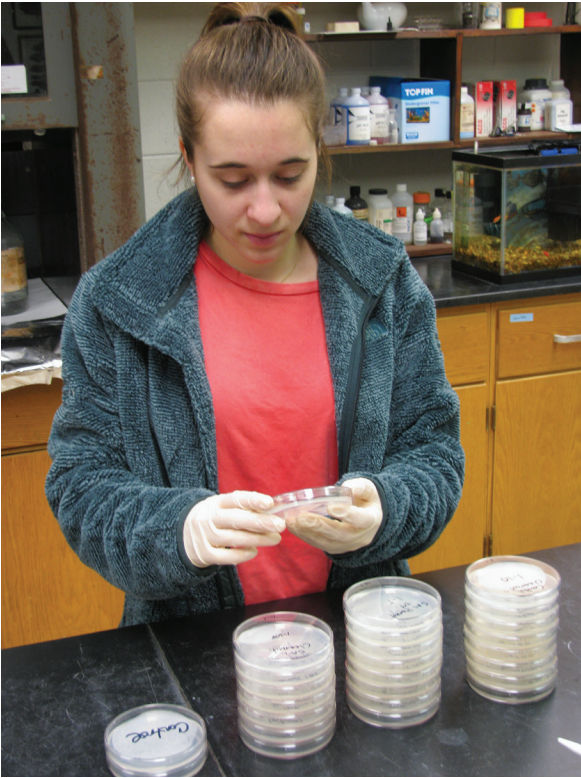
McAlhaney Selected for The Nature Conservancy's Conservation Fellow Program

Starting Fall 2016, Alicia McAlhaney began her M.S. program in Richard Keim's Forested Wetland Ecohydrology lab in RNR, funded as a Conservation Fellow by The Nature Conservancy. The new Conservation Fellows Program is aimed at helping graduate-level and post-doctoral researchers engage the next generation of scientists in directly applied science and policy research. In this case, Alicia is working on a project to understand how water management in forested wetlands affects tree growth, both to learn more about basic ecosystem processes and to help The Nature Conservancy quantify how carbon and nitrogen budgets can be affected by water management. This work is being done at The Nature Conservancy's new Atchafalaya Preserve, where scientists from LSU, Virginia Tech and the University of Louisiana-Lafayette are working on applied research to develop new methods of wetland restoration.

A. Wilbert's Sons Research Internship Program Established; First Award Recipients Named

Based on their ongoing commitment to sustainability and responsible stewardship, A. Wilbert's Sons LLC has agreed to sponsor two research internships in the School. The A. Wilbert's Sons Research Internship in Natural Resources Management offers high-achieving students the opportunity to intern for up to a full-year, pursue a research project and benefit from mentorship by LSU faculty advisors and A. Wilbert's Sons managers. In 1848, Anton Wilbert settled in Plaquemine, Louisiana, from Germany and bought land for timber to support his cabinet and coffin trade. Now known as A. Wilbert's Sons LLC, the family business owns over 120,000 acres in Louisiana and Mississippi. A private landowner, the company manages property ranging from bottomland hardwood timber, plantation pine timber, agricultural row crops, eucalyptus and pasture land to commercial real estate. Thanks to Klein Kirby, Chairman of A. Wilbert's Sons; and RNR alums Vic Blanchard, Land Manager, and Marcus

Rutherford, Forester, for this generous internship opportunity. Recently, the first internships were awarded to Sarah Leblanc and McKenzie Brandon. Sarah was awarded an internship under faculty mentor Dr. William Kelso. For her project, Sarah will be evaluating the relative effects of streamside management zones on the water quality characteristics of two sites, one adjacent to an eight-year-old clearcut and one adjacent to a one-year-old clearcut. Sarah and her research partners, Sarah Buckley and Laura Keys (also RNR), plan to continue their project at least through spring 2017. McKenzie's research internship will be directed by Dr. Kevin Ringelman. For her year-long project, she will be evaluating avian habitat use of recently-harvest and unharvested timber stands during fall migration. McKenzie and her research partner Madelyn McFarland (also RNR, NREM) finished their field work in November 2016 and are currently in the middle of data analysis.



Sarah Leblanc conducts lab analyses.



McKenzie Brandon (l) and her research partner, Madelyn McFarland.





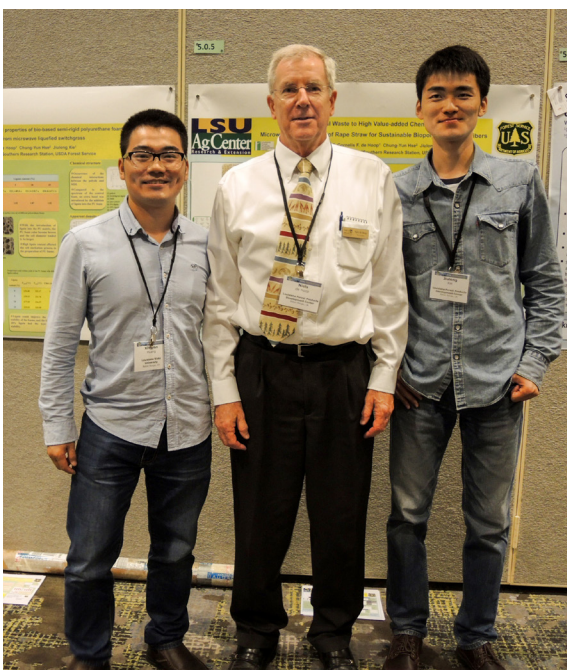
## FACULTY NEWS

### de Hoop Ends Presidency and Students Present at FPS Convention

Dr. Neils de Hoop recently completed his four-year term as the president of the Forest Products Society at the society's international convention held in June 2016 in Portland, Oregon.

De Hoop's students, Jiulong Xie and Xingyan Huang, presented posters at the convention related to their work on developing exciting new products from liquefied wood – wood so hot that it actually turns into a liquid. The products include spray foam insulation and nanocellulose, very fine carbon fibers at the nanometer level.

Nanocellulose is an exciting new field in itself, potentially forming materials that were never heretofore possible. Jiulong recently was offered an Associate Professor position at his home university in Sichuan, China.



Dr. Neils de Hoop (c) and his Ph.D. students Xingyan Huang (l) and Jiulong Xie (r) at the Forestry Products Society's International Convention in Portland, Oregon.

### La Peyre Receives Sam D. Hamilton Award

The 2016 Sam D. Hamilton Award for Transformational Conservation Science was awarded to a team of scientists, managers and academic researchers, including Dr. Megan La Peyre, for the group's development of the Gulf Coast Vulnerability Assessment (GCVA). The Sam D. Hamilton Award recognizes individuals and teams who are working on big picture challenges, developing collaborative partnerships and improving how we create and deliver science for conservation. The GCVA collaboration included over 50 partners across the Gulf of Mexico.

The GCVA evaluated the potential impacts of climate change, sea level rise and urbanization stressors on four Gulf Coast ecosystems and 11 associated species to assess their susceptibility to future change and aid in developing adaptation strategies. Dr. La Peyre led the oyster reef ecosystem assessment team. The GCVA will guide conservation and restoration efforts

by helping partners across the Gulf identify vulnerable areas to focus critical resources. The report is available on-line at: [https://gulfcoastprairielcc.org/media/28949/gcva\\_executivesummary\\_final.pdf](https://gulfcoastprairielcc.org/media/28949/gcva_executivesummary_final.pdf).

### La Peyre's New Book Examines Living Shorelines

RNR professor Megan La Peyre has co-edited a book, "Living Shorelines: The Science and Management of Nature-Based Coastal Protection," with researchers from the Virginia Institute of Marine Sciences and the University of Washington. The scientists examine the management and outcomes of estuarine and coastal shorelines using nature-based shoreline erosion control approaches. Increasingly rapid changes in climate, sea level rise and land use challenge our traditional static approaches to natural resources restoration, particularly in coastal areas. Restoration and management approaches that can adapt and grow with the changing environment are becoming increasingly important tools in coastal protection. Living shorelines is a concept intended not only to protect shorelines and infrastructure, but also to conserve, create or restore natural shoreline functions in estuarine and marine coastal environments. It is increasingly promoted as a way to use the natural environment to protect our coasts from rapid erosion and loss. The book also includes discussions of permitting and policy issues, as well as several examples of projects from the Gulf of Mexico. It is to be published in March 2017 by CRC Press, Taylor and Francis Press.

### RNR Helps Refine Management Advice for Louisiana Oysters

For decades, oysters have been a source of contention among Louisianans: raw, fried or chargrilled? Not surprisingly, Louisiana is the No. 1 producer of oysters in the nation. The value of Louisiana oysters, however, extends well beyond local palates and the economy. The integrity of our coastal ecosystems depends on healthy oyster reefs that prevent shoreline erosion, improve water quality and provide important habitat for our coastal fish, shrimp and crabs. Productive and healthy oyster reefs are characterized by high oyster survival and fast growth, among other things. However, these two biological processes are important considerations when setting management targets for our fisheries and prioritizing areas for conservation and restoration.

Drs. Megan La Peyre and Michael Lowe are currently working to better understand how oyster mortality and growth respond to temperature and salinity in Louisiana's estuaries. Using 30 years of oyster data collected by the Louisiana Department of Wildlife and Fisheries (LDWF), their work demonstrates that Louisiana oyster survival and growth are

enhanced when water temperature and salinity fall within an ideal range. However, exposure to high water temperature (higher than 86° F) and low salinity (less than 5 percent) leads to a substantial increase in oyster mortality and minimal growth. Project collaborators at the University of New Orleans are currently using these estimates of mortality and growth to calibrate their Sustainable Oyster Shellstock (SOS) budget model developed to assist LDWF in ensuring sustainable commercial oyster harvest in public areas.



Dr. Ringelman's lab at the North American Duck Symposium.

### Ringelman Secures Grants, Spearheads International Waterfowl Effort

Kevin Ringelman continued his ongoing research projects in 2016 on nesting waterfowl in North Dakota and on wintering waterfowl on Lake Pontchartrain. In addition, he received three new grants to begin a study of mottled duck breeding ecology in southwest Louisiana. Ringelman also mentored two undergraduate research projects and received the Gamma Sigma Delta Teacher Merit award for outstanding undergraduate instructors. Ringelman is currently spearheading an international effort to develop a comprehensive course in waterfowl ecology and management, and he is pursuing a research partnership and exchange with Ducks Unlimited, Mexico.

### Stouffer Serves as Editor-in-Chief for Prestigious Avian Journal

Dr. Phil Stouffer continues to serve as Editor-in-Chief for "The Condor: Ornithological Applications." The prestigious journal had been published for over 100 years by the Cooper Ornithological Society, but that society has now merged with an even more venerable society, the American Ornithologists' Union, to form the American Ornithological Society. Publications will continue as in the past, now with increased opportunities for open access. Dr. Stouffer also began service as a Regional Reviewer for Tanzania for the citizen science database eBird.



### Rich Vlosky Keynotes Sri Lanka Conference

Dr. Richard P. Vlosky, director of the Louisiana Forest Products Development Center and endowed professor for Crosby Land & Resources Forest Sector Business Development, was the keynote speaker at the 21st International Forestry and Environment Symposium: "Meeting Environmental Challenges in Developing Economies," held in Kandalama, Sri Lanka September 25. The conference is distinguished as the oldest and most renowned conference of its kind in South Asia.

Rich Vlosky registering for the 21st International Forestry and Environment Symposium in Kandalama, Sri Lanka.





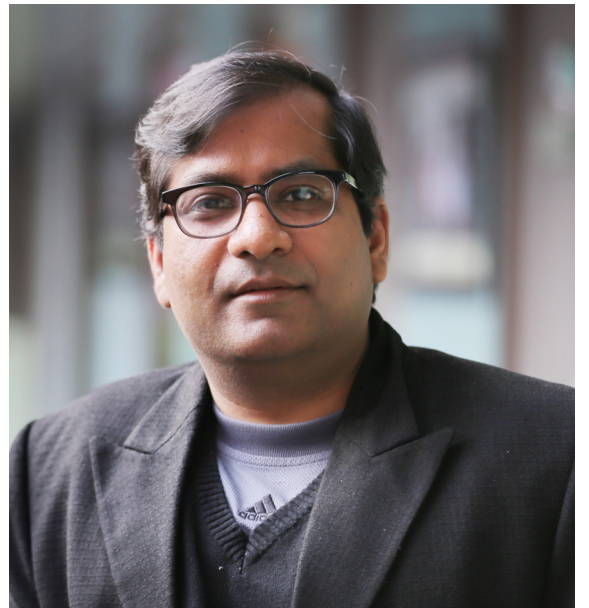
## ALUMNI NEWS

### Mr. Bart R. Yakupzack (B.S. Wildlife 2000)

Bart R. Yakupzack was elected by fellow members to the position of Chairman of the Louisiana Wildlife and Fisheries Commission. Bart is a lifelong resident of south Louisiana, which has been his family's home for over four generations. Bart and his wife Kathryn are raising their two children in Lake Charles. Bart received both a Bachelor of Science in wildlife and fisheries and a law degree from Louisiana State University. He has practiced oil and gas and land management related law for his entire career. Bart serves as Senior Vice President of Jack Lawton Companies.

### Dr. Anand Mishra

Dr. Anand Mishra, a recent graduate who studied under Dr. Richard Vlosky, is Associate Professor and Assistant Dean (Academic Affairs) at the Law School of O.P. Jindal University based in the National Capital Region (NCR) in India. Dr. Mishra teaches courses such as Corporate Finance, Financial Markets and Institutions, and Renewable Energy Economics and Finance. His research interests lie in renewable energy policy and finance, and risk assessment for the renewable energy projects. In his administrative capacity, Dr. Mishra is engaged in planning and scheduling of business-related core and elective courses for the Law School. Anand is also starting a new India Renewable Energy Institute and will be its director.



Dr. Anand Mishra

## In Memoriam

**Greg Barbe** (B.S.F. '95) died Thursday, July 28, 2016, in an accident while working alone on family property. Greg was an Angel Runner with Ainsley's Angels. Through countless volunteer hours, and as an ExxonMobil Science Ambassador, he was able to secure multiple grants for the Zachary Community School System. Greg was a selfless, enthusiastic and energetic man. He would do anything for anyone. He enjoyed spending time with his family hunting, fishing and traveling. He had an unparalleled energy and a joy for life.

**George Arthur Johnson** (B.S.F. '60) passed away on Sunday, February 7, 2016 at East Jefferson General Hospital. George grew up in Bogalusa, Louisiana, where he graduated from Bogalusa High School in 1956. He graduated from Louisiana State University in 1960 with a B.S. Degree in Forestry. George then began his 55 year-long career as a manufacturer's representative for a national tire company. He was also the owner/operator of Bogalusa Discount Tire Store since 1973. George was very involved with Bogalusa Downtown Business development projects and served on its Board. He was a Charter member of the Magic City Carnival Association. George was loved by many family members and friends, who remember him as being positive, cheerful, enthusiastic, loyal and one who always found the good in other people.

**Hugh Montgomery Burnham** (B.S.F. '50, M.S. '65) passed away July 13, 2016. Hugh was employed with Bodcaw Company in Jena, Louisiana, as a forester from 1950-1980. He was promoted to executive vice president in charge of lands, fiber and agriculture. International Paper purchased Bodcaw, and he was transferred to Shreveport, where he was employed as regional manager, then general manager from 1980 to 1991 for fiber supply for all IP mills. He retired from IP in 1991 and was employed as a consultant for TL James Company for a number of years. Hugh served as president of Jena Kiwanis Club, as chairman of the LaSalle General Hospital Board of Directors and worked with the Boy Scouts. He loved to travel by RV, cruises and especially by Amtrak. His other hobbies through the years were fishing, golfing, gardening and especially reading.

**Robert Bascom Martin** (B.S.F. '54; M.F. '61) passed away March 10, 2016. Robert was born October 22, 1930 in Norfield, Mississippi, and grew up in Baton Rouge. A proud graduate of Louisiana State University where he received a B.S. in Forestry Management, an M.S. in Business Management and pursued studies toward a Ph.D. Following graduation he worked briefly for International Paper Company before joining the U.S. Army where he served in Aberdeen, Maryland, in the recovery and handling of explosives. He then joined the Army Reserves and served for 28 years, retiring with the rank of colonel. After the military, he worked at the Kennedy Space Center where he retired in 1996 as Manager of Life Support for EG&G, responsible for all astronaut protective clothing. He was most proud to have received the Outstanding Engineering award from NASA, the only non-degreed engineer to have received this award.

**Hugh Raymond Pardue, Sr.** (B.S.F. '50) of Greenwell Springs, Louisiana, passed away on Sunday, July 17, 2016, after a brief illness. Raymond was born in Baton Rouge on July 28, 1925. He graduated from Istrouma High School in 1943 and from Louisiana State University in 1950 with a degree in forestry. He owned and operated a retail nursery and landscaping company for over 35 years in Baker, Louisiana.

**Lewis Carroll Peters** (B.S.F. '50) passed away on February 22, 2016. He was very much loved and admired by all of his family, friends and nearly everyone he came to know. A true southern gentleman, he never met a soul that he could not find something in common with and treated everyone he encountered with the same respect and courtesy as the next. This world is a better place because he was here. He was born in Baton Rouge on November 14, 1929 and graduated from Baton Rouge High School. He received a Bachelor of Science degree in Forestry from Louisiana State University in 1950 and a master's degree in Forestry in 1951 from Yale University. Lewis was commissioned as a 2nd lieutenant in the U.S. Air Force in 1950, and in 1952, during the Korean conflict, was called to active duty. He remained on active duty until August 1954 and served in the Air Force Reserve until 1958 with an honorable discharge as a captain. He was a retired forester,

spending most of his career as a Consulting forester and a co-owner of the forestry consulting firm Bennett & Peters Inc. until 1997. After retirement from Bennett & Peters, he worked part-time with his son Warren at Peters Forest Resources Inc.

**William "Bill" Read** (B.S.F. '77) of Covington, Louisiana, passed away on Wednesday, June 15, 2016. He was 61. Bill was born on December 7, 1954 in Miami, Florida. The glory days of Bill's childhood were spent in Cedar Key, Florida, starting in 1965, where he attended and eventually graduated from Cedar Key School. While there, Bill enjoyed fishing on his family boat, the wooden Sea Dragon, and played many a prank with lifelong friends. As a child, Bill was a star athlete, playing football and basketball during Les Robinson's time at Cedar Key School. Eventually, Bill moved to Baton Rouge where he attended Louisiana State University and graduated with B.S. and M.F. degrees in forestry. After college, Bill spent several years working to preserve the outdoors before settling into financial services within Merrill Lynch's New Orleans office. Bill's family most fondly remembers him as a true mountain man who often hiked, fished, golfed, camped and bird watched. Bill also had a profound appreciation for music, which he inherited from his parents, and a wild sense of humor. He will be greatly missed by many.

**Samuel Nathaniel Saxon** (B.S.F. '61) of Tupelo, Mississippi, died April 28, 2016, surrounded by members of his loving family. A former Marine Corps. sergeant, and member of the Tupelo Chapter of the Marine Corps League, Mr. Saxon followed Marine Corps discipline in his daily life. He always kept himself in top physical condition, working out on a regimented schedule. He graduated from Louisiana State University with a B.S. in forestry. He pursued his passion for the outdoors as a professional forester serving the U.S. Forest Service and the Mississippi Forestry Commission, from which he retired after more than three decades of service. After his retirement, he continued this passion working from time to time on his farm in Chickasaw County, Miss., which has been in the Saxon family since the early 1800s.



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**How you can help.** We always need guest speakers, field trip and research sites, internship opportunities, and jobs for our students. We also need your financial support, large or small, to support scholarships for undergraduate and graduate students. This support is particularly important in light of tuition increases and decreases to the TOPS program. Endowed chairs and fellowships help us recruit and retain faculty to accommodate increased enrollment and expand our course and research offerings.

**Join:** The Forestry, Wildlife and Fisheries Alumni Association and the College of Agriculture Alumni Association. Information on both organizations are available on our website, [www.rnr.lsu.edu](http://www.rnr.lsu.edu).

**Update:** We have mailing information for all of our alums, but not many email addresses. Please send me an email so we can continue our transition to digital correspondence. I promise we will not inundate your email account with junk! This will allow us to save thousands of dollars per year. Email: Allen Rutherford at [druther@lsu.edu](mailto:druther@lsu.edu)

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Pre-Vet wildlife/wildlife and fisheries  
Ecological restoration  
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Forest enterprise



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